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— of inventorship (Rule 4.17(iv)) for US only

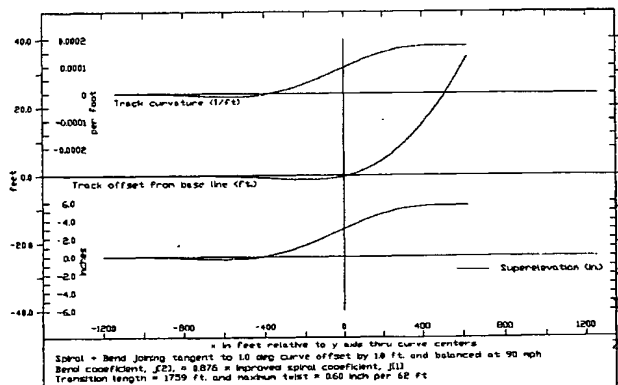
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For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: METHOD FOR DESIGNING GENERALIZED SPIRALS, BENDS, JOGS, AND WIGGLES FOR RAILROAD TRACKS AND VEHICLE GUIDEWAYS



(57) Abstract: A prior method for designing transition curves for railroad tracks and other vehicle guideways begin with a choice of a roll function representing a functional form for variation of the track or guideway roll or cant angle as a function of distance and requires the curvature of the transition shape to keep the components of centripetal and gravitational acceleration in the plane of the track or guideway equal at each point along the shape and integrates the equation expressing that equality as part of a procedure for determining the resulting transition curve shape. That method is supplemented by a method [Fig. 4] of defining basic roll functions in terms of Gegenbauer orthogonal polynomials, including roll functions which generate simple spirals as well as more complex shapes (referred to as bends, jogs, and wiggles)[Figs. 1, 2 and 3]. Roll functions for the various shapes are defined as weighted sums of the basic roll functions, and can generate transition curve shapes that have good dynamic characteristics and that are more general than the shapes that can be constructed using the prior method. A resulting generalized spiral [Fig. 5] can be used to compensate for inadequate offset when a spiral needs to be lengthened for operation at higher speed or to realign an existing spiral whose shape has become so different from its original design shape that restoration to that shape would be impractical.

## INTERNATIONAL SEARCH REPORT

International application No.

PC 03/09667

## A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : G06F 17/10

US CL : 703/2, 7

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 703/2, 7; 104/164, 189

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

STN: USPATFULL, INSPEC, EUROPATFULL; IEL/IEEE

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 4,693,183 A (POTZSCH) 15 September 1987, Background of the Invention, Summary of the Invention.	1-17
A	US 4,860,666 A (SMITH) 29 August 1989, Background of the Invention, summary of the Invention.	1-17
A	US 5,791,254 A (MARES et al) 11 August 1998, Background of the Invention, Summary of the Invention.	1-17
A	AHMADIAN, M. Filtering Effects of Mid-Cord Offset Measurements on Track Geometry Data, Proceedings of the 1999 ASME/IEEE Joint Railroad Conference, 1990, pages 157-161.	1-17

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Further documents are listed in the continuation of Box C.

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See patent family annex.

\* Special categories of cited documents:

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